

Crop Science

Crop Science is designed to challenge students interested in the fundamentals of soil use, land management, environmental conservation and the efficient production of various field crops, fruits, berries, and vegetables. The 21st century will see the need for improved management of these natural resources and an increased production of the food commodities produced on our limited amount of soil.

Pre-requisites: Any two courses in the Natural Resources Sub-cluster

Recommended Credit: 1 or 2

Recommended Grade Levels: 11th or 12th

*** 1 denotes learning expectations that must be met when teaching the course for the 1st credit.**

**** All other learning expectations must be met when teaching the course for the 2nd credit.**

Crop Science

Standard 1.0

The student will evaluate principles for efficient production of agricultural crops for food, feed or fiber.

Standard 2.0

The student will demonstrate the principles involved in the efficient production of corn, cotton, soybeans, grain sorghum, and tobacco.

Standard 3.0

The student will demonstrate the principles involved in the efficient production of small grains, forage, hay, and pasture.

Standard 4.0

The student will evaluate the principles involved in the efficient production of various vegetable crops for maximum production.

Standard 5.0

The student will demonstrate principles for efficient fruit, nut, and berry production.

Standard 6.0

The student will integrate academic competencies in the area of agricultural crop production.

Standard 7.0

The student will develop premier leadership and personal growth needed for careers in the area of crop production.

Course Description:

This course is designed to challenge students interested in the fundamentals of soil use, land management, environmental conservation and the efficient production of various field crops, fruits, berries, and vegetables.

Standard 1.0

The student will evaluate principles for efficient production of agricultural crops for food, feed or fiber.

Learning Expectations:

The student will:

- | | | |
|-----|---|---|
| 1.1 | Relate the principles of land preparation as they apply to specific crops. | 1 |
| 1.2 | Determine correct timing and rates of fertilizer to apply to specific crops. | 1 |
| 1.3 | Correctly take soil samples including the filling out of specific crop tests. | 1 |
| 1.4 | Determine soil drainage and structural needs for specific crops. | 1 |
| 1.5 | Explain the function of plant parts related to plant anatomy. | 1 |
| 1.6 | Recommend pesticides related to the production of specified crops. | 1 |

Evidence standard is met:

The student will:

- Recommend tillage methods and equipment needed to prepare seedbeds.
- Relate specific crops to recommended fertilizer requirements based on soil test recommendations.
- Determine internal drainage classes as related to specified crop needs.
- Diagram functions of major plant parts.
- Prepare examples of pesticides and explain the procedure for safe handling and mixing.

Integration/Linkages

Mathematics, Botany, Plant Anatomy, Soil Science, Biology, Chemistry, Economics, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills), OSHA Standards, TOSHA Standards

Sample Performance Tasks

- Describe the type of land preparation needed for specified crops grown in seedbed preparation.
- Explain how soil tests are used to ensure the proper use of fertilizer amounts and analysis.
- Evaluate soils for specific physical properties needed for specific crops (crop productivity from land judging card).
- Diagram the major plant parts and summarize their functions.
- Identify pests and match with correct pesticide to use in controlling or eradicating the pest.
- Present how an integrated pest management (IPM) plan, as related to specific crops, targets pests (ex-lady bugs-aphid control).
- Explain the need for correct mixing of pesticides to ensure protection of the environment.

Standard 2.0

The student will demonstrate the principles involved in the efficient production of corn, cotton, soybeans, grain sorghum, and tobacco.

Learning Expectations:

The student will:

- | | | |
|-----|---|---|
| 2.1 | Determine the correct tillage equipment to be used in land preparation for specified crops. | 1 |
| 2.2 | Calculate the most efficient fertilizer rate and method of application. | 1 |
| 2.3 | Discover problems associated with fertilizer application to protect the environment. | 1 |
| 2.4 | Determine the economic importance and use of an agricultural crop. | 1 |
| 2.5 | Organize specific plants using stem, leaf, flower, and fruit morphology. | 1 |
| 2.6 | Evaluate the newest technologies in crop production and management. | 1 |

Evidence Standard Is Met:

The student will:

- Recommend tillage equipment used for crop production.
- Calculate the horsepower requirements needed for specified tillage equipment.
- Determine fertilizer rates for specific crops.

- Examine the problems associated with contamination and pollution using herbicides and pesticides.
- Calculate profit margins using various marketing techniques.
- Determine the most efficient tillage method for local areas.

Integration/Linkages

Mathematics, Biology, Chemistry, Physics, Ecology, Economics, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks:

- Present a tillage usage plan for land preparation.
- Explain the choices to be made in fertilizers in order to assure attainment of correct nutrient values.
- Debate the liability of agriculturists for the contamination of the environment from the use of pesticides or fertilizers.
- Develop a portfolio that identifies plants using the stem, leaf, flower, or fruit.
- Present a plan for providing income from a local crop.

Standard 3.0

The student will demonstrate the principles involved in the efficient production of small grains, forage, hay, and pasture.

Learning Expectations:

The student will:

- | | | |
|-----|--|----------|
| 3.1 | Evaluate the different pieces of tillage equipment used in land preparation for non-row crop species. | 1 |
| 3.2 | Calculate the most efficient fertilizer analysis, rate and method of application for non-row crop species. | 1 |
| 3.3 | Evaluate problems associated with wastewater management using irrigation, pesticide and fertilizer applications. | 1 |
| 3.4 | Compare the economic advantages and disadvantages of using natural pests instead of pesticides (IPM). | |
| 3.5 | Determine weed species and non-row crop species using morphology. | |
| 3.6 | Recognize the economic importance of specified crops as feeds for animals and as crops for human consumption. | |

Evidence Standard is Met:

The student will:

- Determine the correct analysis of fertilizer for specific crops.
- Calculate the most efficient fertilizer rate per acre for specific crops.
- Use the Internet to research tillage systems that are most economical.
- Determine climatic conditions needed for optimum growth.
- Determine specific seeding (planting) rates needed for specified crops.

Integration/Linkages:

Mathematics, Biology, Chemistry, Physics, Economics, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks:

- Develop a report to determine the most economical tillage system to be used for the specific crop grown.
- Identify plants using stem morphology.
- Explain the economic importance of specific crops.
- Develop a yearly maintenance plan to ensure optimum growth for a specified crop.
- Demonstrate the appropriate preparation of a soil test sample.

Standard 4.0

The student will evaluate the principles involved in the efficient production of various vegetable crops for maximum production.

Learning Expectations:

The student will:

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|-----|--|
| 4.1 | Recommend the machinery and equipment needed for land preparation for vegetable crop production. |
| 4.2 | Evaluate the importance of timing the correct application of fertilizer, pesticide, lime, and other chemicals. |
| 4.3 | Relate labor requirements to specific vegetable crops with regard to machinery or land tillage methods. |
| 4.4 | Research the use of technologically improved seeds in the production of specific vegetables. |
| 4.5 | Determine the importance of water, temperature, and other climatic factors involved in the production of vegetables. |
| 4.6 | Determine the most efficient marketing techniques for the local area. |

4.7 Evaluate the most efficient harvest methods and post harvest functions for perennials.

Evidence Standard is Met:

The student will:

- Determine the most efficient type of machinery needed for acreage to be planted.
- Calculate fertilizer requirements for specific vegetables per 1000 sq. ft. or acres.
- Use proper mixing and application methods for pesticide and fertilizer applications.
- Compare the advantages and disadvantages of using genetically altered seeds.
- Determine climatic needs of specific crops when selecting, preparing and planting specific vegetables.
- Recommend various market outlets for vegetable crop production.

Integration/Linkages

Mathematics, Soil Science, Biology, Chemistry, Economics, Marketing, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks

- List methods of weed prevention for vegetable crops.
- Start plants for transplanting from seed in the greenhouse or classroom.
- Correlate pesticides for target pests for specified crops.
- Determine length and width needed to secure 1000 sq. ft. area.
- Convert metric measurements of harvested product to standard US equivalents.
- Calibrate sprayer for coverage of specified areas.
- Select proper weight of seeds to assure correct populations.
- Specify methods of marketing available locally.
- Estimate local retail prices for specified vegetables.

Standard 5.0

The student will demonstrate principles for efficient fruit, nut, and berry production.

Learning Expectations:

The student will:

- 5.1 Determine the equipment needed to prepare the soil for planting.
- 5.2 Compare the advantages of purchasing superior stock for production.
- 5.3 Determine the correct type and rate of fertilizer needed for maximum production.
- 5.4 Evaluate the techniques used to control diseases, pests, and weeds.
- 5.5 Determine the best marketing strategy for local area.

Evidence Standard is Met:

The student will:

- Apply principles of supply and demand to determine economic feasibility of various crops.
- Calculate needed pesticide for specific crop grown (ex., fungicide...).
- Compare costs of standard stock versus superior stock for production.
- Determine site requirements for specific crops (ex., sunlight, water, drainage...).
- Explain fertilizer application techniques unique to tree fruits and nuts.
- Propose goals of production for a specified acreage of crop.

Integration/Linkage

Mathematics, Economics, Soil Science, Biology, Chemistry, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks:

- Describe how the principles of supply and demand affect the production of agricultural crops.
- Demonstrate how to apply sprays to crops.
- Prescribe steps needed to maintain orchards.
- Explain the cultural requirements of specific crops.
- Determine fertilizer and pH requirements of specific crops.

Standard 6.0

The student will integrate academic competencies in the area of agricultural crop production.

Language Arts:

The student will:

- 6.1 Synthesize research data in an original work to be presented either orally or in writing on the importance of crop production.
- 6.2 Use computer technology to aid in researching and formatting presentations.
- 6.3 Browse, select, and record information from Internet sources on crop production.

Mathematics:

The student will:

- 6.4 Calculate fertilizer application rates for 100 sq. ft., 1000 sq. ft., and acre areas. **1**
- 6.5 Estimate profit margins with given input values.
- 6.6 Apply algebraic formulas to solve input and output estimates.
- 6.7 Calculate horsepower ratings required for certain tillage implements. **1**
- 6.8 Calibrate sprayers for volumes to be applied per acre designated. **1**

Science:

The student will:

- 6.9 Diagram plant parts and match with functions. **1**
- 6.10 Identify plant species by use of morphology. **1**
- 6.11 Explain the importance of internal drainage for crop growth. **1**
- 6.12 Compare environmental advantages and disadvantages of tillage systems. **1**

Evidence Standard is Met:

The student will:

- Present a written or an oral report addressing a current issue related to crop production.
- Prepare a rationale for consideration of new planting techniques and seed varieties available to agriculturists.
- Prepare a written report on the use and depletion of natural resources on the US and other countries.

Integration/Linkages

Mathematics, Science, Social Studies, Language Arts, Economics, SCANS (Secretary's Commission on Achieving Necessary Skills)

Sample Performance Tasks:

- Research the impact of new technology to improve yields of agricultural products produced in the US.
- Prepare technical information to determine horsepower requirements.
- Safely operate machinery and equipment in land preparation.
- Calibrate sprayers using metric and standard volumes.

Standard 7.0

The student will develop premier leadership and personal growth needed for careers in the area of crop production.

Learning Expectations:

The student will:

- 7.1 Demonstrate positive work attitudes and ethics. **1**
- 7.2 Demonstrate knowledge of skills necessary for advancement in a career. **1**
- 7.3 Describe career plans that reflect critical thinking skills to encourage life-long learning.
- 7.4 Demonstrate proper time management skills.
- 7.5 Develop and/or improve human relations skills. **1**

Evidence Standard is Met:

The student will:

- Recommend ways one can demonstrate positive work attitudes and behaviors.
- Debate how attitudes can affect one's ability to succeed in production when changes occur.

- Describe employment goals for the next five years.
- Describe how proper planning and organization can affect the outcomes of a project.

Integration/Linkages

Mathematics, Science, Social Studies, Language Arts, SCANS (Secretary's Commission on Achieving Necessary Skills), National FFA Guidelines for Prepared Speaking CDE, career development event, National FFA Guidelines for Extemporaneous Speaking, National FFA Guidelines for Proficiency Awards and Degrees, National FFA Guidelines for Community Education Programs

Sample Performance Tasks:

- Participate in a class discussion on attitudes and behaviors common to the workplace.
- Role-play a situation where you are an employee communicating with your supervisor about changes that are occurring.
- Present a six-to-eight-minute speech about the importance of crop production to the American people, using FFA guidelines.
- Chart an outline of your employment goals for five years with crop production and goals.
- Prepare a four-to-six-minute extemporaneous speech on new technologies in crop production and safety involved, using FFA guidelines.
- Complete a FFA proficiency award application, based on the student's SAEP, supervised agricultural experience program.
- Complete an application for an advanced degree in the FFA.
- Participate in FFA PALS program.
- Participate in Food for America Program.
- Participate in FFA Partners for a Safer Community.
- Participate in Farm Safety Just 4 Kids.
- Participate in America Reads Challenge.